

What is claimed is:

1. A task switching apparatus for switching execution of a task assigned to a time slot by switching time slots in a processor, comprising:
 - 5 an assigning unit operable to assign each of a plurality of first type tasks to a single time slot and a plurality of second type tasks different from the first type tasks to a single specified time slot; and a task selecting unit operable to select a first type task assigned to the time slot when current time slot is switched to a time slot other than the specified time slot and to select a second type task from the plurality of second type tasks when the time slot is switched to the specified time slot.
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 - 15 2. The task switching apparatus according to Claim 1, wherein the second type task has a priority, and the task selecting unit selects a second type task from the plurality of second type tasks according to priorities.
 - 20 3. The task switching apparatus according to Claim 2, wherein the assigning unit determines time of the specified time slot which is residual time obtained by subtracting total time of time slots to which the plurality of first type tasks are assigned from time of a predetermined period.
 - 25 4. The task switching apparatus according to Claim 3, wherein the assigning unit recalculates the residual time so as to determine it as the time of the specified time slot every time it assigns a new first type task to a time slot.
 - 30 5. The task switching apparatus according to Claim 1, wherein the first type task is a task with specification of assignment time, and

the assigning unit, when trying to add a new first type task, if total sum of total assignment time of already-assigned tasks and assignment time of the new first type task exceeds time for a period, refuse to assign a time slot to the new first type task.

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6. The task switching apparatus according to Claim 1, further comprising:

a storing unit operable to store lock information showing whether a resource capable of being accessed by a task is in a lock state because of access by any of tasks or not; and

10 a changing unit operable to change a state of a task from an executable state to a waiting state when the task under execution is trying to access a resource in a lock state and change a state of the task from a waiting state to an executable state when the resource 15 is unlocked, and

wherein the task selecting unit eliminates a task in a waiting state from selecting targets.

7. The task switching apparatus according to Claim 6, further 20 comprising:

a shifting unit operable to shift the processor to a power-saving state when no executable tasks is included in first type and second type tasks.

25 8. The task switching apparatus according to any of Claim 1 wherein the processor includes at least two register sets for storing task contexts, further comprising:

30 a switching unit operable to prepare one of the register sets for using it for a task under execution, return the context of a task to be completed next to another register set using background processing and switch register sets when switching time slots.

9. A task switching apparatus for switching tasks to be completed in a processor by switching time slots to which a task is assigned, comprising:

5 a first generating unit operable to assign a single time slot to each first type task whose assignment time is specified and generate time slot information including assignment time of each task corresponding to each of the time slots;

10 a second generating unit operable to assign a plurality of second type tasks with a priority to a single specified time slot and generate a single piece of time slot information including assignment time and a priority of the specified time slot;

15 a third generating unit operable to generate the task management information including an address of each of tasks assigned to a time slot;

20 a storing unit operable to store the generated time slot information and task management information being associated with each other;

25 a selecting unit operable to select time slot information stored in the storing unit at least once in a period; and

30 a control unit operable to allow an execution of a task indicating task management information corresponding to the time slot information when time slot information to which a first type task is assigned is selected, select a task from a plurality of pieces of task management information corresponding to the time slot information according to priorities and allow an execution of the task indicated by the selected task management information when time slot information to which a second type task is assigned is selected.

10. The task switching apparatus according to Claim 9,

30 wherein the storing unit stores pieces of task management information of second type tasks as a queue in which the pieces of task management information are aligned in priority order,

the control unit selects tasks corresponding to leading task management information of the queue.

11. The task switching apparatus according to Claim 10,

5 wherein the second generating unit sets difference between the period and total assignment time of all first type tasks in the specified time slot information as assignment time of the specified time slot.

10 12. The task switching apparatus according to Claim 11,

wherein the second generating unit recalculates the residual time so as to determine assignment time of the specified time slot every time first generating unit assigns a time slot to a new first type time slot.

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13. The task switching apparatus according to Claim 12 wherein the storing unit further stores lock information showing whether a resource capable of being accessed by a task is in a lock state because of access by any of tasks, the task switching apparatus 20 further comprising:

a queue managing unit operable to dissociate task management information of the task stored in the storing unit from time slot information when a task under execution is trying to access a resource in a lock state, have the storing unit store the task 25 management information as a wait queue, and have the storing unit store task management information in a wait queue associating with time slot information when the resource is unlocked.

14. The task switching apparatus according to Claim 13 wherein 30 the processor equips at least two register sets for storing contexts of tasks, further comprising:

a register set switching unit operable to prepare one of the

register sets for using it for a task under execution, return the context of a task to be completed next to another register set using background processing and switch register sets when switching time slots.

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15. A task switching method for switching execution of a task assigned to a time slot by switching time slots in a processor, including:

10 an assigning step of assigning each of a plurality of first type tasks to a time slot and assigning a plurality of second type tasks different from the first type tasks to a specified time slot; and

15 a task selecting step of selecting a task assigned to the time slot when the task is switched to another time slot except the specified time slot and selecting a task from a plurality of second type tasks when the task is switched to the specified time slot.

16. A program for switching execution of a task assigned to a time slot by switching time slots in a processor, the program causing the processor to execute:

20 an assigning step of assigning each of the plurality of first type tasks to a time slot and assigning a plurality of second type tasks different from the first type to a specified time slot; and

25 a task selecting step of selecting a task assigned to the time slot when an after-switching time slot is not the specified time slot and selecting a task from the plurality of second type tasks so as to execute the task when the after-switching time slot is the specified time slot.

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